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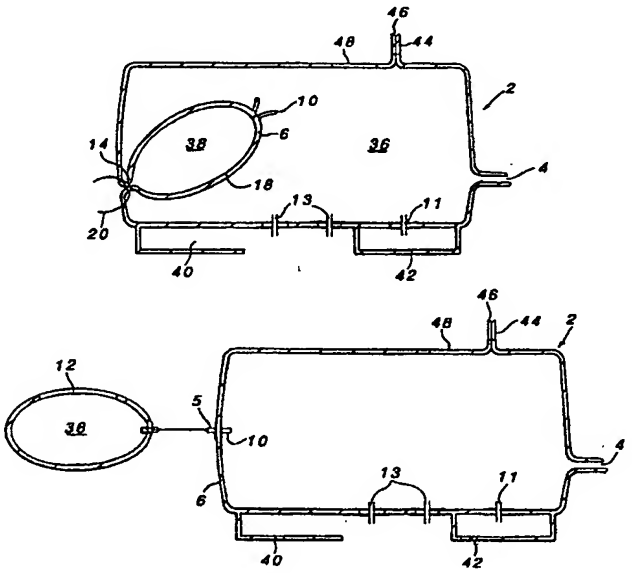

(57) Abstract

A packaging for a deflated inflatable liferaft comprises a bag (2) into which said liferaft is hermetically sealed, said bag being adapted to house the liferaft and enable an emergency pack (16) to be attached directly or indirectly to the liferaft such that the emergency pack is accessible without unsealing the liferaft. In one embodiment that bag is divided into two discrete compartments (36, 38) which are adapted to receive the liferaft and emergency pack. In another embodiment the bag is adapted to enable the emergency pack to be attached to the liferaft through the bag. Also disclosed are methods of packaging a liferaft in the packaging of the invention and a liferaft adapted to be so packaged.

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DESCRIPTION

LIFERAFT PACKAGING

The present invention relates to a liferaft packaging, and more particularly, but not exclusively, to an improved method of packaging an inflatable liferaft and a liferaft adapted to be so packaged.

An inflatable liferaft is usually packaged in a deflated state, together with a gas cylinder and an emergency pack containing items such as distress flares, a first aid kit, food and water which emergency pack is usually packed inside the liferaft and retained within a rigid container or a soft valise with the liferaft. In an emergency, the packaged liferaft is launched into the water where it automatically opens releasing the liferaft which is inflated by the gas cylinder.

One problem with the way liferafts are currently packaged is that the presence of, for example, water vapour, salt, and oxygen leads to the corrosion of metallic parts and the deterioration of, for example fabric, webbing, and rope. It is therefore desirable to service a packaged liferaft at regular intervals. In fact it is a requirement for a liferaft approved under the regulations of the International Maritime Organisation or its administrations to be serviced annually.

Servicing involves returning the liferaft to an approved service station where it is unpacked, inflated, tested, serviced and the items of the emergency pack replaced. The cost of such servicing is high and requires the ship to be present at a port having an approved service station, which presents difficulties in logistics, and of course, down-time for the ship whilst the liferaft is taken off and serviced.

The regulations of the International Maritime Organisation or its administrations recently changed to allow a proposal for approval of Novel Methods of liferaft packaging which would require a service every five years provided that the liferaft was packaged so as to maintain the same standards achieved by annual servicing. However, it is still a requirement that such liferafts are inspected on board annually by certified personnel, and where appropriate items of the emergency pack replaced annually. This has the advantage that the overall cost of servicing to the ship owner can be reduced.

It is one aim of the invention to improve the method of packaging a liferaft such that the service life of the liferaft is extended.

It is known to vacuum pack or seal pack liferafts. This has the advantage of sealing the liferaft against the environment and makes the liferaft more compact and therefore easier to fit into a small

container. However, it has the disadvantage that components, particularly gas inflation parts can be damaged by the compression forces involved. Also, the compression forces exerted during vacuum sealing can lead to welding of the liferaft's fabric. Furthermore, a vacuum still does not preclude water molecules being drawn through the packaging material, which water molecules may in turn lead to deterioration, albeit in a reduced amount. Also, it is not possible to access the emergency pack for regular replacement of perishable items without opening the vacuum pack.

One solution to extending the service life of an approved liferaft has been proposed in WO92/03333 (Unitor). In order to achieve this object, both the liferaft and the container have been completely redesigned. The container comprises two watertight compartments with a watertight partition separating the two sections. In one section is stowed the liferaft and in the other section the gas cylinder and emergency pack; the second section can be accessed independently of the first section thereby allowing for the annual replacement of perishable items. The waterproof partition has apertures for the connection of the gas cylinder to the liferaft and at the same time forms a section of the base of the liferaft. In use, when the liferaft has been inflated, the second section sits directly underneath the liferaft and it is necessary to

lift a hatch in the floor or cut the floor of the liferaft to access the emergency pack. The design has the drawback that the container is costly. Furthermore, the specific design of liferaft incorporating at least part of the container means that known liferafts cannot be packaged by this method. Also the attachment of the container to the floor of the liferaft weakens the liferaft, and because it is necessary to cut through the floor of the liferaft or open a hatch, this can further weaken the liferaft which can be a problem if leakage is occurring through the container underneath the cut floor portion.

It is an aim of the present invention to overcome or alleviate the aforegoing disadvantages.

In accordance with a first aspect of the present invention there is provided a packaging for a deflated inflatable liferaft comprising a bag (2) into which said liferaft is hermetically sealed, said bag being adapted to house the liferaft and enable an emergency pack (16) to be attached directly or indirectly to the liferaft such that the emergency pack is accessible without unsealing the liferaft.

This has the advantage that, the liferaft is sealed from the environment whilst the emergency pack is accessible for regular replacement of its perishable items, thus extending the service life of the liferaft. Furthermore, because the liferaft is hermetically

sealed within a bag it can be packed within a standard container and the bag can contain a substantially standard liferaft.

In one embodiment the bag comprises means internally for attaching the liferaft thereto.

Preferably, the means internally for attaching it to the liferaft comprises one or more straps, mating member or wires.

Preferably the bag comprises means, such as, for example, eyelets and a draw cord or strap, by which the bag can be sub-divided to form two discrete compartments. Other means enabling a watertight seal to be achieved may of course be provided.

Preferably, the emergency pack is kept independent of the liferaft by forming a pouch within the bag.

In another embodiment the bag comprises means externally for attaching the emergency pack thereto.

Preferably, the means externally comprises one or more straps, mating members or wires.

In another embodiment the emergency pack is connected to the liferaft through the bag.

The bag is provided with means enabling a painter line to be connected to the liferaft. Preferably, this is in the form of a sealable aperture.

Similarly, the bag is provided with means enabling a gas inflation mechanism to be connected to

the liferaft. Preferably this is in the form of one or more sealable apertures.

Other preferred features include the provision of an area of weakness on the bag to facilitate controlled bursting when the liferaft is caused to inflate and the provision of one or more windows through which, for example, an indicator such as an humidity or carbon dioxide detector can be read.

When the cylinder is retain within the bag the provision of a weak area in the bag provides a means for detecting a gas leak since the weak area will burst under pressure allowing moisture to enter the bag. In this way the humidity indicator can be used to indicate a gas leak. In consequence, it is preferred that a window is positioned near the weak area of the bag and a humidity indicator is placed by the window. Alternatively, a carbondioxide indicator can be incorporated within the bag.

In accordance with another aspect of the present invention, there is provided a method of packaging a liferaft into a packaging which method comprises hermetically sealing a deflated and folded liferaft (9) within a bag (2) and connecting an emergency pack to the liferaft, such that the emergency pack is accessible without unsealing the liferaft.

In one embodiment a pouch for housing an emergency pack is formed in the bag by clamping a

portion of the bag comprising open and closed ends in the vicinity of the closed end and turning the open end back on itself to enclose the pouch.

Preferably the liferaft is attached at the closed end of the bag such that when the bag (after the liferaft has been sealed therein) opens, by bursting due to the liferaft being inflated, the pouch housing the emergency pack remains attached to the liferaft such that it is drawn into the liferaft.

Alternatively, the emergency pack may be attached externally of the bag either to the end face of the bag which end face is attached internally to the liferaft or through the bag.

Preferably, a dessicant and/or humidity indicator and/or a carbon dioxide indicator is added prior to sealing the bag.

The inflation means may be included internally or externally of the bag and the bag is adapted accordingly with the provision of support means and sealable apertures through which the necessary connections can be made.

To prevent the liferaft upturning on inflation the inflation cylinder may be mounted below a buoyancy tube of the liferaft externally of the bag. More preferably still the inflation means are hermetically sealed or shrinked wrapped.

Alternatively, the cylinder may be placed

internally of the bag. To prevent the liferaft upturning on inflation the liferaft is sealed in the bag in a manner such that the sealed bag containing the liferaft can be folded and placed in the cradle with the cylinder substantially downwards. Thus, when the liferaft is released the bag unfolds so it lies with the cylinder downwards in the water before the bag bursts and the liferaft inflates.

In accordance with yet a further aspect of the present invention there is provided a liferaft adapted to enable it to be packaged according to the invention wherein the liferaft comprises means on the liferaft floor adjacent to a buoyancy tube of the liferaft and preferably about the canopy entrance (where present) to enable it to be attached to a packaging according to the invention.

By way of example only, specific embodiments of the invention will now be described, with reference to the accompanying drawings, in which:-

Fig. 1 is a cross sectional view of a bag constructed in accordance with one embodiment of the present invention;

Fig 2 is a cross sectional view of a bag constructed in accordance with another embodiment of the present invention;

Fig. 3a, 3b and 3c show schematically the folding of a liferaft according to one embodiment of

the present invention;

Fig. 4 is a schematic illustration of a bag, constructed in accordance with one embodiment of the present invention with the inflation apparatus illustrated as attached internally or externally;

Figs. 5 to 8 are schematic illustrations showing method steps in the packaging of a liferaft in the bag of Fig. 4;

Fig. 9 is a schematic illustration of a hermetic bag, with emergency pack attached, constructed in accordance with a further embodiment of the present invention;

Fig. 10 is a detail of one embodiment of the painter exit of the bag of Fig. 4 or Fig. 9;

Figs. 11 and 12 and 13 are details of various embodiments of the inflation mechanism connection of the bag of Fig. 4 or Fig. 9;

Figs. 14 and 15 are details of various embodiments of the painter and/or gas inflation mechanism of the bag of Figs. 4 and 9; and

Fig. 16 is a schematic illustration of a liferaft packed in accordance with the present invention in a container;

Figs. 17a to 17d show a schematic illustration of the sealed bag unfolding prior to inflation; and

Figs. 18a and 18b show an arrangement for a

Davit Launch Container.

Fig. 1 illustrates a bag 2 according to one aspect of the present invention. It is shown substantially as it would look were it to contain a liferaft and emergency pack, but these are not shown for clarity.

The bag 2 comprises two compartments, a first compartment 36 adapted to receive a liferaft (not shown) and a second compartment 38 in the form of a pouch 18 adapted to receive an emergency pack (not shown).

The open end 4 of the bag is ultimately hermetically sealed with a liferaft inside. The closed end 6 of the bag has means, for example, straps, 10 extending internally within the bag enabling the bag to be attached to the liferaft.

The wall of the bag comprises hermetically sealable openings 13 through which the liferaft can be connected to an inflation system 17 (not shown) comprising a cylinder 15 and associated gas inflation hoses (not shown). The cylinder may be supported in a sleeve 40 or other means provided externally of the bag.

The wall of the bag also comprises a hermetically sealable painter line exit 11 through which the painter line, connectable to the liferaft, can pass. About this exit, there may be provided

another sleeve or the like 42 externally of the bag for tidying away excess painter line.

Other features of the bag include an area of weakness 44 produced by welding a fold and forming a nick 46 therein and a window 48 through which the condition of the bag may be viewed by, for example, checking, for example, a humidity indicator which may be positioned there below.

This particular embodiment enables an emergency pack to be accessed by loosening a cord or strap 20 from eyelets 14.

Referring to Fig. 2, another embodiment of the bag is shown in which the emergency pack may be packed so as to be accessible without unsealing the liferaft. In this example a liferaft is attached to the bag via means internally comprising a strap 10 and the emergency pack is attached via means externally comprising a strap 5. Alternatively, the bag may comprise means (see for example Figs. 9 to 15) for attaching the emergency pack to the liferaft through the bag. Otherwise the features of the bag are substantially similar to those described with reference to Fig. 1 The positions and number of the respective communicating means 11 and 13 will depend on the type of liferaft being packaged. The compartment 38 housing the emergency pack is provided with a tearaway strip 12 for ease of opening.

In order that the liferaft can be packaged efficiently such that it opens and inflates when needed it is important to fold it in a suitable manner and orientate it carefully within the bag. It may also be necessary to make some minor modifications to the liferaft such as incorporating connection means to the liferaft, in the form of, for example, patches.

Fig. 3 shows in schematic form (3a, 3b and 3c) a modified related liferaft being folded for packaging and then being inflated.

In Fig. 3a, a deflated liferaft 9 is shown in plan view. It comprises a floor 50, two inflation tubes 52, 54 about the circumference of the liferaft which on inflation form the liferaft walls, a canopy 56 and a canopy entrance 58. The buoyancy tubes 52 and 54 are provided with valves 62, 64 for connection to the inflation means.

On the liferaft floor 50, in the vicinity of the canopy 58, adjacent to the buoyancy tubes 52, 54 are provided means 60 for connecting the liferaft to the bag. The means 60 is in the form of a patch with a mating member which is connected to means 10 in the form of straps provided on the inside of the bag.

The bag is carefully folded such that the connection means 60 and valves 62 64 are accessible when the liferaft is packaged into he bag. This is best achieved by folding the sides inwards (Fig. 3b)

and rolling the liferaft from the end remote from the connection means 60 (Fig. 3c). Rolling the liferaft in this manner makes inflation simpler.

The liferaft 9 is then packed into the hermetically sealed package, sack or bag 2 (hereinafter referred to as bag) which is then placed inside the liferaft container 34 (Fig. 16). The bag is preferably made from a material such as MOISTOP (trade mark) which is a material comprising a layer of abrasion resistant urethane, an aluminium foil moisture barrier, and a weldable inner layer.

Referring to Fig. 4, the bag 2 is substantially elongate, one end 4 of which, in the longitudinal plane, is open and the opposite end 6 of which has a section 8 of gradually reducing diameter, wherein the width at the open end 4 is greater than the width of the bag at the opposite end 6.

The bag 2 comprises straps 10 extending inwardly from the end 6, a tear-away strip 12, sealing an additional opening in the bag 2 (not illustrated), eyelets 14 welded into the fabric of the bag, a painter exit 11, and one or more exits 13 for a gas inflation system including a gas cylinder 15 where the gas cylinder is mounted outside the bag. Alternatively, the gas cylinder 15 may be housed inside the bag.

Referring to Fig. 5, in order to pack a deflated and folded liferaft in the bag, the bag 2 is

turned inside-out and the straps 10 tied into the liferaft 9. The bag is tied to the liferaft in the vicinity of the canopy entrance 58 of the liferaft for reasons that will become apparent hereinafter. The emergency pack 16 is then placed within the inside-out bag, adjacent the end 6 of the bag 2 which is in the vicinity of the liferaft canopy entrance. On larger liferafts, an open plastics box or open ended large diameter tube is inserted first and then the emergency pack is placed in the tube. Therefore, the emergency pack is in the vicinity of the entrance to the liferaft 9 preferably connected to the floor 50 of the liferaft adjacent to the buoyancy tubes 52, 54. The part of the bag 2 immediately surrounding the emergency pack 16 is closed by placing a strap 20 through the eyelets 14 and drawing the eyelets 14 together, thus forming a pouch 18 for the emergency pack within the bag 2 (see Fig. 6).

If the gas cylinder 15' and inflation system 17 is to be retained inside the bag, that is if they do not require inspection annually, then the gas cylinder and inflation system is fitted to the liferaft at this stage. If the gas cylinder is to be retained outside the bag, then it is fitted at a later stage.

The bag is then reversed (turned back on itself so it is the right way round) and pulled over the liferaft 9 (see Fig. 7). Once the bag has been

reversed, the pouch 18 is enclosed within the bag 2 adjacent the canopy entrance to the liferaft 9, by virtue of the straps 10 holding the end of the bag 2 to the liferaft, and with the eyelets 14 at the folded back edge 22 of the bag 2, such that, by untying the straps 20, access to the emergency pack 16 within the pouch 18 of the bag 2 is possible.

The painter is taken from the liferaft out through the painter exit 11 and welded into position to complete its seal through the bag. The welding uses a heat sealing tool or H.F. tool to seal the grommet and bag about the painter. If the gas cylinders are to be fitted separately ie. have not been included within the bag, then the alignment of the gas inflation hoses is checked through the grommets which have already been pre-welded into the bag. One or more pack of desiccant 3 is then placed into the bag. The open end 4 of the bag is sealed using a heat sealing tool or H.F. closing tool. If the gas inflation system is to be fitted separately, it is fitted at this stage (see Fig. 8).

If the gas inflation equipment is to be external to the bag, such that it can be checked without unsealing the bag, the bag could have a fabric sleeve or flap 40, in which the gas cylinder 15 can be placed.

In Fig. 9, a further embodiment of the bag is illustrated, the construction of the bag differs from

that of Fig. 4 as follows:-

The bag 2 is a substantially elongate bag of uniform cross section. The painter exit 11, gas inflation mechanism connection 17 are connected as per the embodiment of Fig. 4. The eyelets 14 and strip 12 and its associated opening are omitted. The straps 10 are replaced by straps 5 which extend both internally and externally to the bag. The liferaft is packed into the bag as before, however, in this instance, the emergency pack is not within a pouch 18 within the bag, but is attached to the bag 2 by the straps 5 which extend externally to the bag 2.

Referring to Fig. 10, in which a detail of the painter exit 11 is shown, rope or webbing cannot achieve a total seal, therefore a stainless steel wire connecting 'strap' 23 is used, which is welded or shrunk into a plastic tube 24. The internal end of the strap is connected to the painter patch 25.

Referring to Fig. 11, a detail of the inflation mechanism connection is shown, where the gas inflation system, including the gas (CO_2) cylinder or cylinders 15', the operating mechanism 26 and inflation hoses 27, are included within the bag. The inflation mechanism pull 28 exits the bag at exit 13 similar to the painter. Sufficient slack is left in the bag to allow the pull to be operated.

Referring to Figs. 12 and 13, a detail of the

inflation mechanism connection 17 is shown for a system in which the gas cylinders are packaged externally to the bag. In this instance, the gas inflation hose 27 passes through the bag 2 via an exit 13. This can be done either by passing the hose through a tube, or grommet 28 (Fig. 12) and shrinking or heat sealing it into position or by clamping a reinforcing washer 29 through the inlet valve (Fig. 13).

Alternatively and as illustrated in Fig. 14, the painter and/or gas inflation mechanism pull is connected by welding an eyelet or grommet 30 into the bag 2 and a webbing, rope, or wire loop 32 is threaded around it or welded into position (see Fig. 14) to form an exit 13. Also, where movement or pull is required, the eyelet or grommet 30 can be reversed, see for example, the case of a gas inflation pull (Fig. 15). The emergency pack 16 can also be connected using either of these options.

Each of the above connections through the bag can be utilised to connect the launch mechanism for a Davit launched liferaft.

The liferaft once hermetically sealed in its bag together with the emergency pack and gas inflation mechanism, is ready to be installed in the container 34 (see Fig. 16) and the painter is suitably coiled or laced and led out of the container through a grommet and the container is closed. Excess painter line can

be held in a sleeve 42 or other suitable means such as a mechanism for coiling or lacing the excess painter line.

The container 34 can be closed by disposable bands or a re-usable band system with a clamp/overlock tightening closure. This will make access to the container for annual or bi-annual replacement of emergency pack and the subsequent closure of the container easier.

The gas inflation means when packed externally to the bag could be vacuum packed or heavy duty shrink wrapped, to reduce the corrosive effect of the atmosphere. Furthermore, a safety check indicator or a carbon dioxide chemical indicator, which changes colour in the presence of carbon dioxide, could be included. A humidity indicator could also be incorporated within the hermetically sealed bag, which indicator changes colour if the humidity goes above 40%. The container could contain a clear window 44, to enable a visual check on the indicators and emergency pack to be made without a need for opening the bag, thereby allowing early detection of a problem.

The annual inspection will be undertaken by opening the container and checking the general condition of the bag; if a humidity indicator is fitted, this will be checked. The emergency pack will then be opened. In the case of the embodiment of Fig.

1, this involves untying the straps 20 and reaching into the pouch 18, to remove and replace the necessary equipment replaced. After checking the emergency pack, the straps 20 are re-tied. If the gas inflation system is stowed outside the hermetically sealed bag, this will be checked by test weighing and if necessary the gas cylinder will be recharged.

The operating head and hoses will be checked and inspected. If necessary these can be replaced.

Full service of the liferaft at five yearly intervals will involve taking the liferaft to a service station for test inflation. After testing, the liferaft will be deflated, folded and repackaged in a new hermetically sealed bag.

In order to inflate the liferaft 9 in an emergency situation, the painter is pulled. When the painter is pulled free of its seal through the hermetically sealed bag, inflation of the liferaft commences. However, if the gas cylinders are stowed separately to the liferaft 9, then the painter does not need to be pulled free of the bag. On inflation the inflating liferaft tears open the hermetically sealed bag via weak area 44, 46. In the case when the emergency pack is contained in the pouch 18 within the hermetically sealed bag the pouch 18 is drawn into the liferaft canopy entrance as the liferaft inflates around it, and the main portion of the bag is torn open

by the inflating liferaft. Occupants of the liferaft will have access to the emergency kit in the pouch by removing the tear-away strip 12 to reveal the contents of the pouch 18. In the alternative construction of the bag the emergency pack is tied to the liferaft by the straps 5. In this case, as the liferaft inflates and bursts the bag at a weak point 46, formed by, for example, welding a portion of the bag together and cutting a V into it 44, 46. The emergency pack is retained on the liferaft by the straps 5. If the straps 5 are short, the emergency pack is drawn through the entrance to the canopy of the liferaft as it inflates. If the straps 5 are long, it will be necessary for the occupants to pull in the emergency pack.

Referring to Figs. 17a to 17d a liferaft (9) and cylinder (15) is packaged in a bag (2) and the bag (2) with contents is folded in half as shown in Fig. 17a in a container (34). On use the container (34) opens and the bag and contents (2, 9, 15) open as shown in Fig. 17b so that the liferaft is in its correct position. The bag (2) bursts (Fig. 17c) and inflates the liferaft in the correct position.

By packing a liferaft in the manner indicated the hermetically sealed bag can be placed in a standard Davit-Launch container so that the two halves of the container would fall away to either side of the

liferaft on use.

Referring to Figs. 18a and 18b a packaged liferaft is illustrated which shows the modifications made to the bag (2) to enable it to be used for a Davit Launch. The emergency pack is contained within the liferaft. A davit ring 48 is attached to the liferaft through the bag (2) with a gasket (70). The bag (2) is also provided with a bowsing line exit (72) and painter line exit (11).

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CLAIMS

1. A packaging for a deflated inflatable liferaft comprising a bag (2) into which said liferaft is hermetically sealed, said bag being adapted to house the liferaft and enable an emergency pack (16) to be attached directly or indirectly to the liferaft such that the emergency pack is accessible without unsealing the liferaft.

2. A packaging as claimed in claim 1 wherein the bag comprises means (10) internally for attaching the liferaft thereto.

3. A packaging as claimed in claim 2 wherein the means (10) internally comprises one or more straps, mating members or wires.

4. A packaging as claimed in any of the preceding claims wherein the bag comprise means (14, 20) by which the bag can be sub-divided to form two discrete compartments.

5. A packaging as claimed in claim 4 wherein a first watertight compartment (36) is adapted to receive the liferaft and a second watertight compartment (38) is adapted to receive the emergency pack.

6. A packaging as claimed in any of claims 1 to 3 wherein the bag comprises means (5) externally for attaching the emergency pack thereto.

7. A packaging as claimed in claim 6

wherein the means (5) externally comprises one or more straps, mating members or wires.

8. A packaging as claimed in claim 1 wherein the bag comprises means (23, 24; 28, 29, 30, 32) for attaching the emergency pack to the liferaft through the bag.

9. A packaging as claimed in any of the preceeding claims wherein the bag comprises a painter exit (11).

10. A packaging as claimed in any of the preceding claims wherein the bag comprises one or more exits or entries (13) for a gas inflation mechanism.

11. A packaging as claimed in any of the preceding claims wherein the bag is provided with a sleeve or other means (40, 42) for supporting a gas cylinder and/or excess painter line.

12. A packaging as claimed in any of the previous claims which is provided with an area of weakness to facilitate controlled bursting when the liferaft is inflated.

13. A packaging as claimed in claim 13 wherein the area of weakness (44) is produced by welding a fold and forming a nick (46) therein.

14. A packaging as claimed in any of the preceding claims comprising a clear window (48).

15. A method of packaging a liferaft into a packaging which method comprises hermetically sealing a

deflated and folded liferaft (9) within a bag (2) and connecting an emergency pack to the liferaft, such that the emergency pack is accessible without unsealing the liferaft.

16. A method as claimed in claim 15 wherein a pouch (18) for housing an emergency pack, is formed in the bag by clamping a portion of the bag comprising open (4) and closed (6) ends in the vicinity of the closed end and turning the open end (4) back on itself, to enclose the pouch (18).

17. A method as claimed in claim 16 wherein the liferaft is attached at the closed end of the bag such that when the bag opens to release the liferaft, the pouch (18) housing the emergency pack remains attached to the liferaft such that it is drawn in to the liferaft.

18. A method as claimed in claim 15 wherein the emergency pack is connected directly or indirectly to the liferaft.

19. A method as claimed in claim 18 wherein the emergency pack is connected directly to the liferaft through the bag.

20. A method as claimed in claim 18 wherein the emergency pack is connected indirectly to the liferaft by way of connections provided internally and externally of the bag.

21. A method as claimed in any of claims 15

to 20 wherein a dessicant and/or a humidity indicator and/or a carbondioxide indicator is added prior to sealing the open end of the bag.

22. A method as claimed in any of claims 15 to 21 wherein inflation means are connected to the liferaft and housed internally or externally of the bag.

23. A method as claimed in claim 22 wherein the inflation means are housed externally of the bag and are hermetically sealed or shrinkwrapped.

24. A method as claimed in claims 22 or 23 wherein a cylinder of the inflation means is housed below a buoyancy tube of the liferaft.

25. A liferaft, adapted to enable it to be packed according to the invention wherein the liferaft comprises means on the liferaft floor adjacent to a buoyancy tube of the liferaft and preferably about the canopy entrance (where present) to enable it to to attached to a packaging according to the invention.

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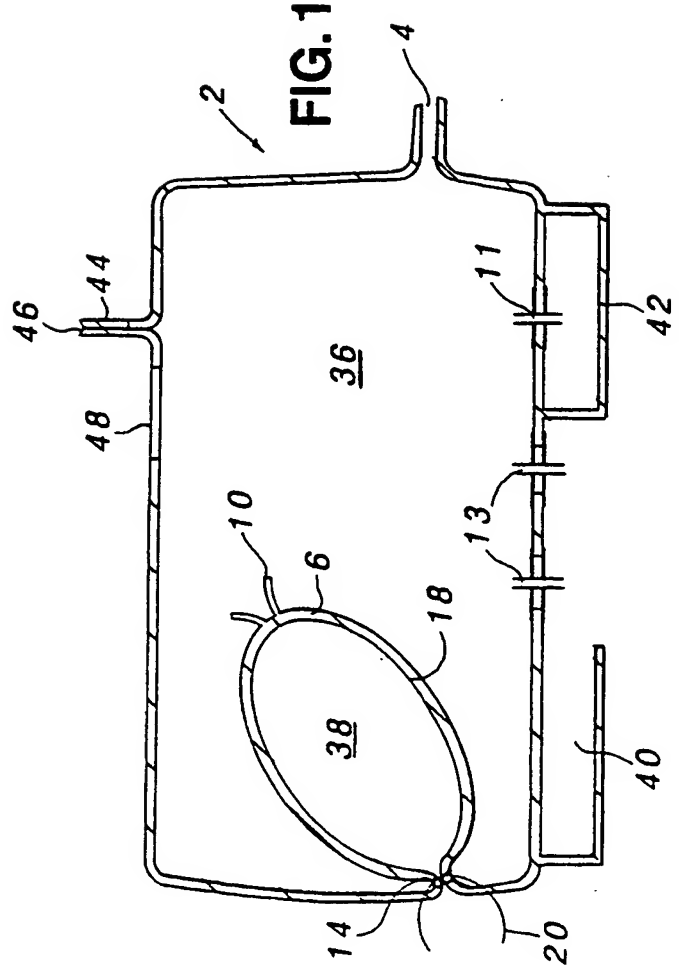
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20

FIG. 1

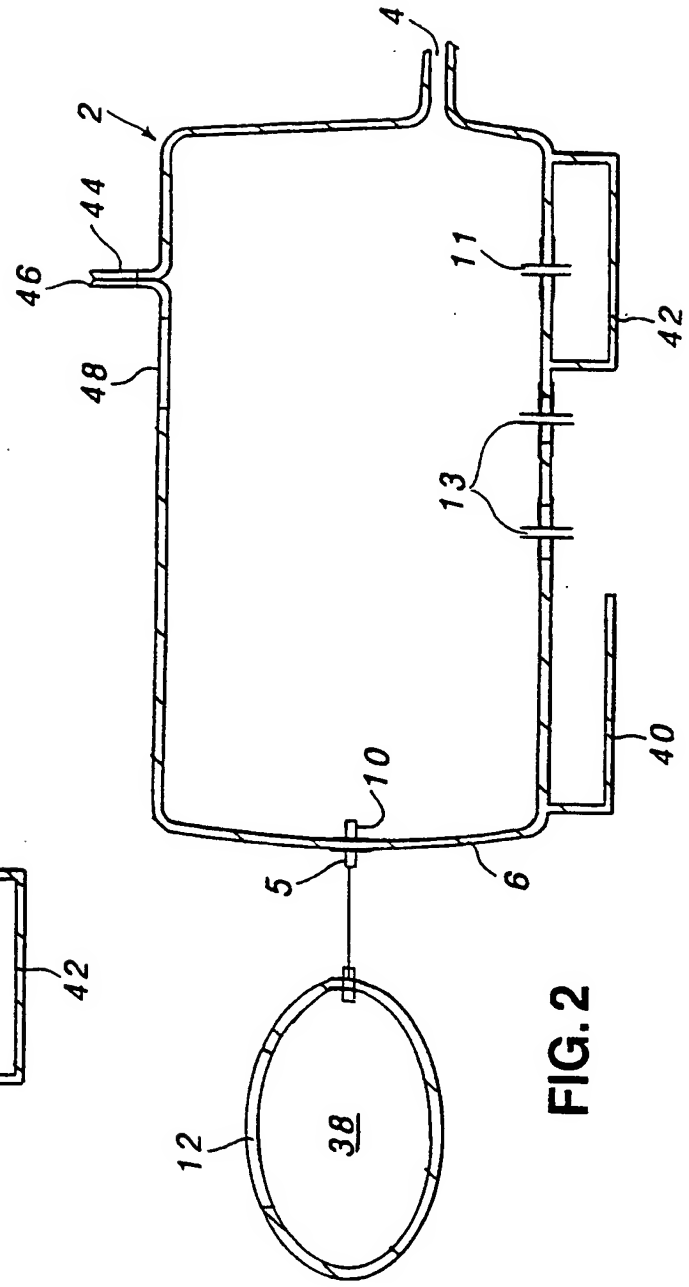
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FIG. 2

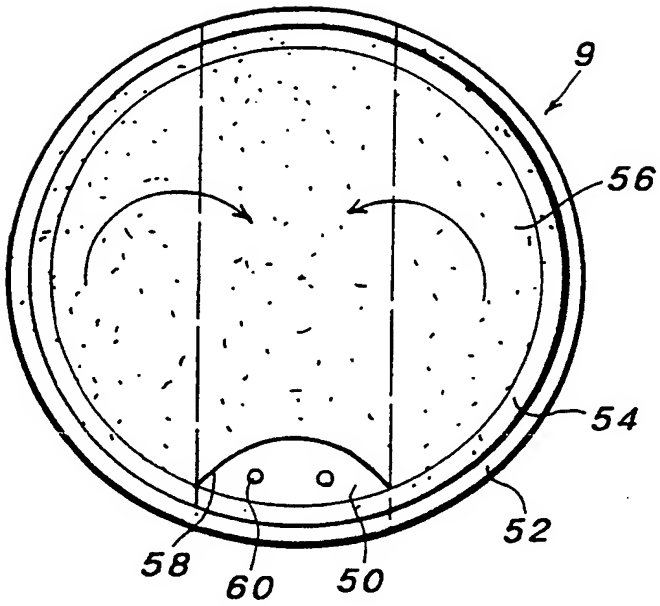


FIG. 3a

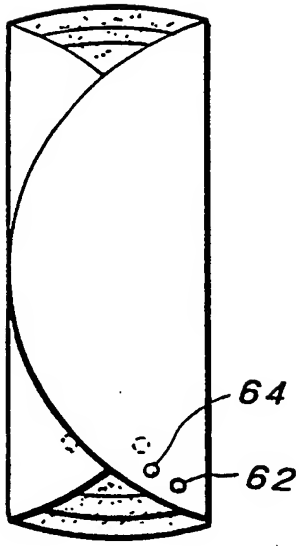


FIG. 3b

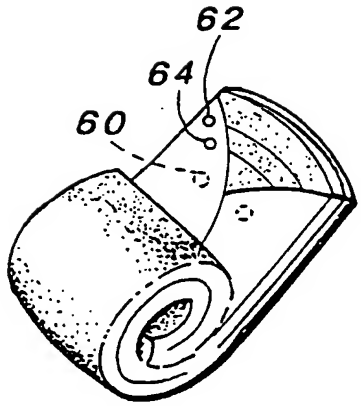


FIG. 3c

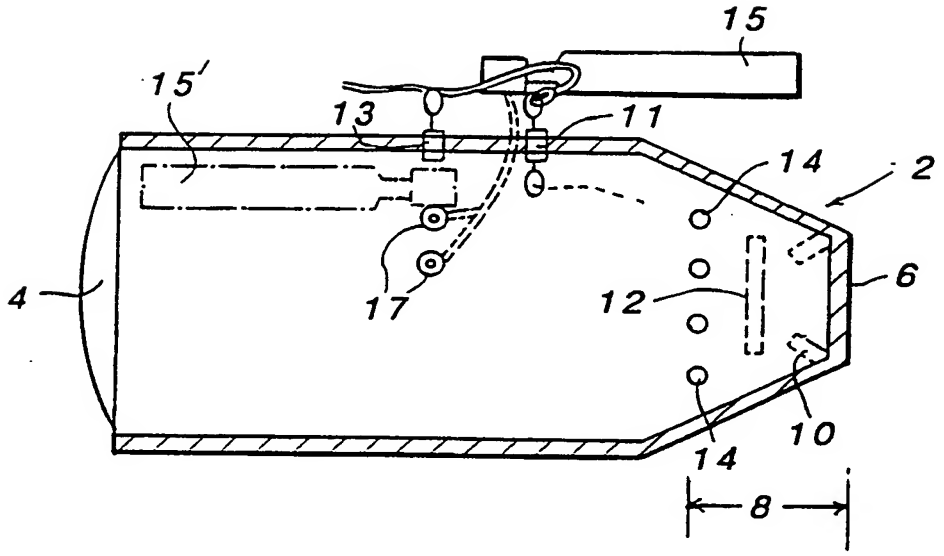
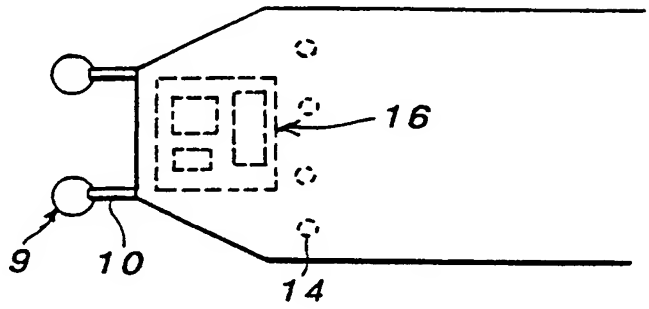


FIG. 4

FIG. 5



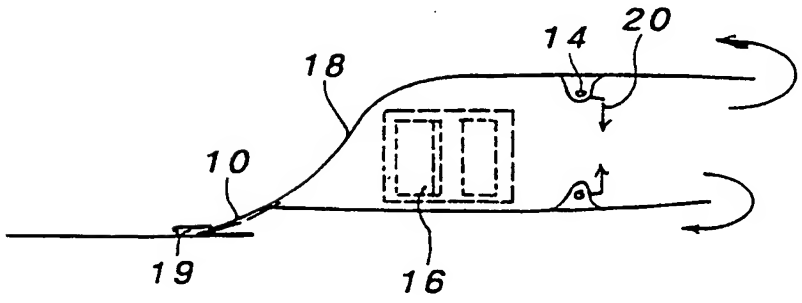


FIG. 6

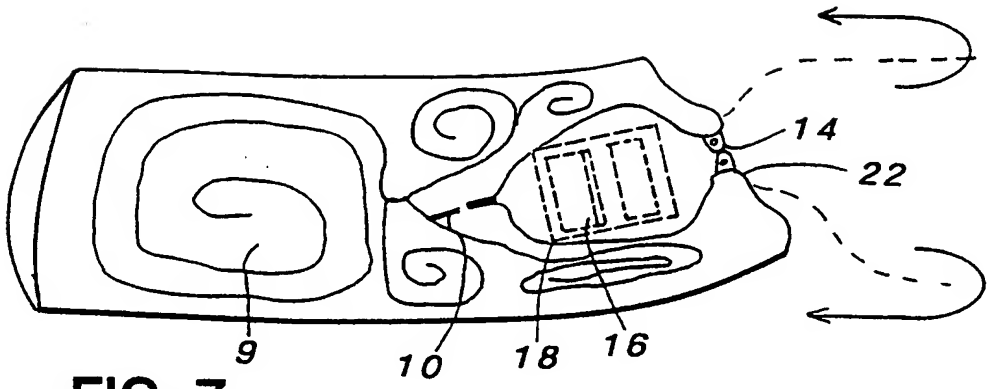


FIG. 7

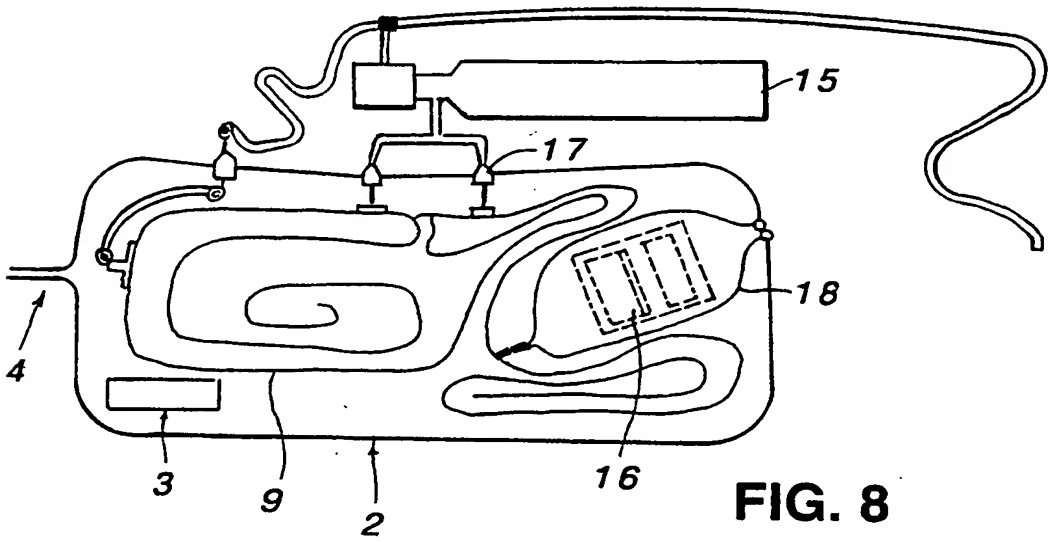


FIG. 8

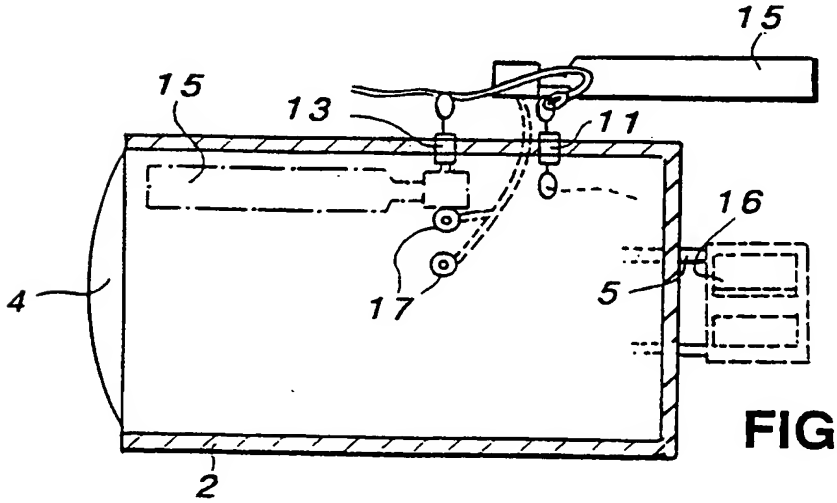


FIG. 9

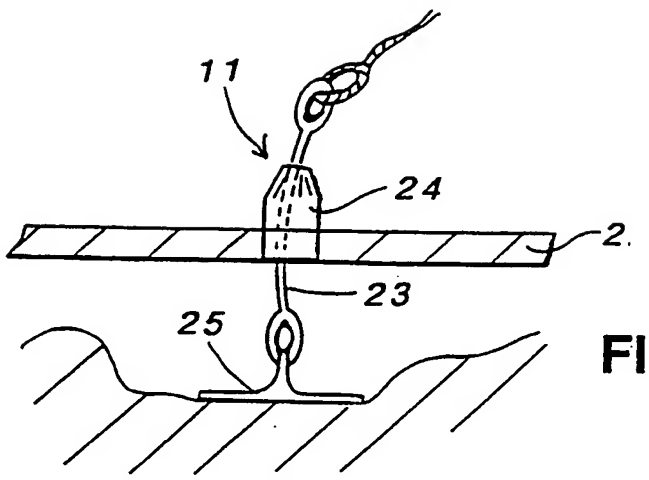


FIG. 10

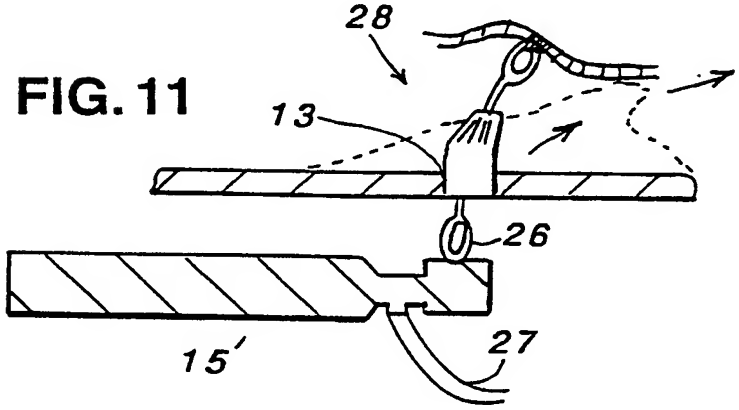


FIG. 11

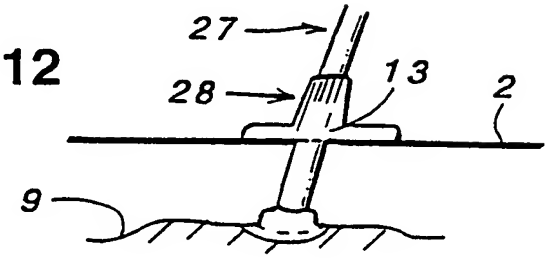


FIG. 12

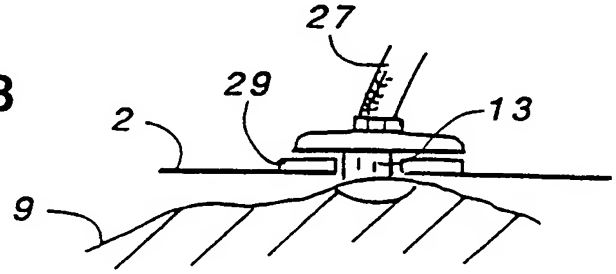


FIG. 13

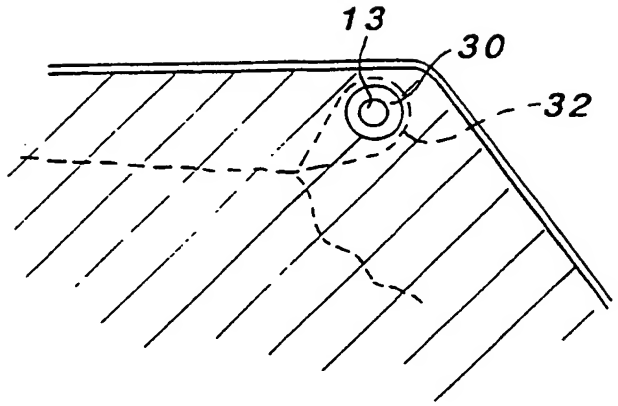


FIG. 14

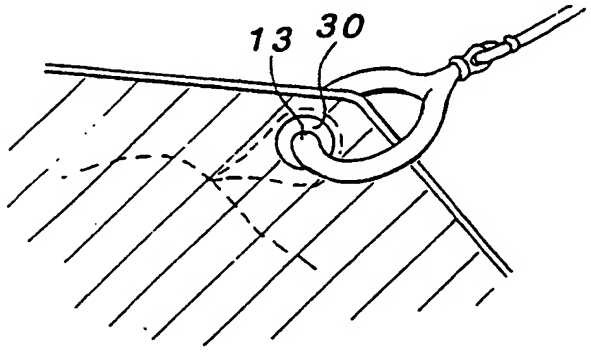


FIG. 15

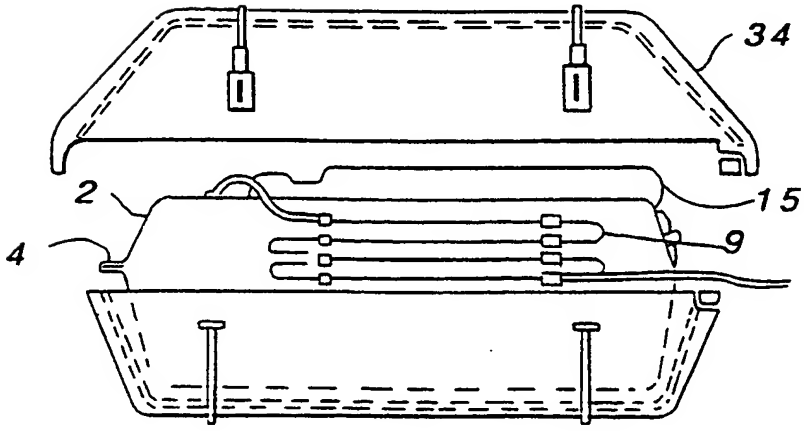


FIG. 16

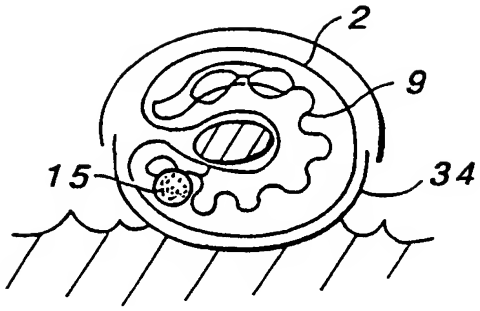


FIG. 17a

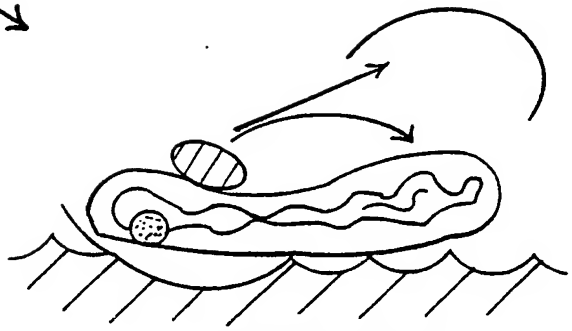


FIG. 17b

FIG. 17c

FIG. 17d

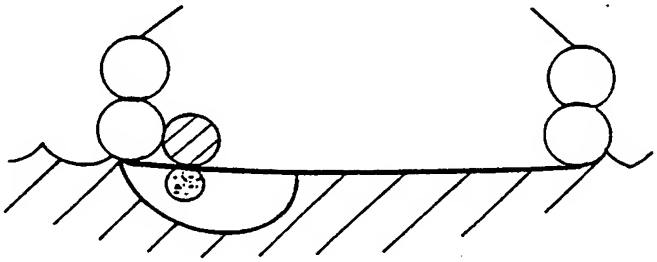
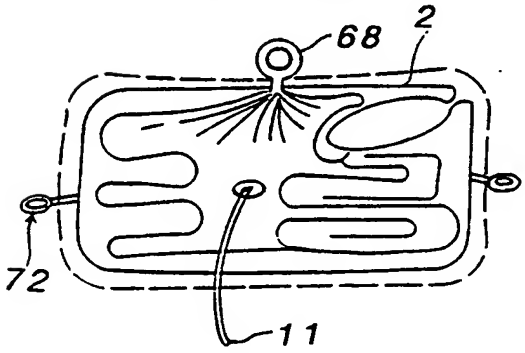


FIG. 18a



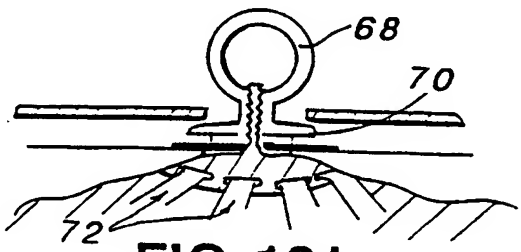


FIG. 18b

INTERNATIONAL SEARCH REPORT

Inte mal Application No
PCT/GB 96/01835

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B63C9/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B63C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO,A,92 03333 (UNITOR) 5 March 1992 cited in the application see the whole document	1-13,15
Y	EP,A,0 119 333 (GULF&WESTERN MANUFACTURING CO) 26 September 1984 see page 6, line 7 - page 7, line 30; figures 1-3	1-13,15
Y	EP,A,0 146 736 (AUTOFLUG G.M.B.H) 3 July 1985	9,11
A	see page 7, paragraph 1-2; figures 1,2	1,14
A	BE,A,563 098 (SOCOPRO) 10 June 1958 see page 4, paragraph 2; figures 1,2	1,16-24

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
12 November 1996	18. 11. 96
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	Authorized officer DE SENA, A

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. onal Application No
PCT/GB 96/01835

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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		AU-B-	652957	15-09-94
		AU-A-	8405091	17-03-92
		CA-A-	2090002	25-02-92
		DE-D-	69102705	04-08-94
		DE-T-	69102705	19-01-95
		EP-A-	0544780	09-06-93
		ES-T-	2059149	01-11-94
		JP-T-	6503770	28-04-94
		US-A-	5342230	30-08-94
EP-A-119333	26-09-84	NONE		
EP-A-146736	03-07-85	DE-C-	3341163	18-07-85
		US-A-	4666413	19-05-87
BE-A-563098		NONE		